

OPERATION BLACKBOARD

Essential Facilities

at

the Primary Stage

Norms and Specifications

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Norms and Specifications

(Developed by NCERT and Bureau of Indian Standards)

Editors

P.N. DAVE

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राष्ट्रीय शैक्षिक अनुसंधान और प्रशिक्षण परिषद्
NATIONAL COUNCIL OF EDUCATIONAL RESEARCH AND TRAINING

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Foreword

The concept of threshold facilities in the context of core curriculum was first put forward in the "National Curriculum for Primary and Secondary Education—A Framework" brought out by NCERT in 1985. It stated that "For effective transaction of a core curriculum, it is imperative that *certain minimum facilities* must be provided to the schools of the nation." This term was debated considerably in NCERT before it found place in the Framework. The dictionary meaning of the word in terms of physiology and psychology is extremely appropriate and convincing. It is defined as "The point at which a physiological or psychological effect begins to be produced, as that degree of stimulation of a nerve or nerve centre which just produces a response." In educational terminology it is assumed that desired learning outcomes can be achieved only if necessary inputs in terms of educational facilities are provided to a school. In the absence of such basic inputs it is not possible for a school to generate desired learning in children.

The plea for making provision of minimum facilities not only found favour in the National Policy on Education (1986) but also got converted into a dynamic scheme entitled "Operation Blackboard" (OB), encompassing both certain physical and educational facilities along with a two all weather room school.

As the recommendations of the NPE started concretising the OB scheme got a new impetus and NCERT got involved in preparing the list of minimum items to be included in the scheme. A preliminary list so prepared was included in the Plan of Action (POA). As it became a centrally sponsored scheme, involving the budget of crores of rupees to be provided to the States, need for prescribing norms and specifications not only for purchase but also for development/preparation/production of each of the items in the list was felt.

The Ministry of Human Resource Development (MHRD) urgently addressed itself to the question and a meeting of officers in MHRD, Bureau of Indian Standards (BIS) and NCERT was convened to discuss the issues related to norms and specifications of items included in the scheme. Consequent upon the decision of this meeting, a committee of the officers of NCERT and BIS was constituted to develop the norms and specifications. The committee met several times and finalised the format and content of the document.

Although the task of obtaining, collating and consolidating information was arduous, various Indian Standards formulated by BIS and made available to the Committee were found extremely useful in drawing upon the norms and specifications. It is not an exaggeration to state that the authors of the write-ups of the various items not only depended upon but also benefitted from this rich source. However, having little experience to develop such a document, it has taken far more time to finalise it than was expected at the initial stage. While it leaves much to be desired, it documents at one place a fair amount of information which could be immensely helpful to users in making decisions about the purchase of items.

Needless to mention, this is indeed not a single-shot activity. On the contrary this should be considered just a beginning in the important sector of education. It has tremendous potential for further development to the advantage of the beneficiaries. It is envisaged that a lot of information will be pouring in once this document is widely disseminated, which in turn would require its upgrading at the appropriate intervals of time. Thus this should be considered a modest beginning.

In the end, it is necessary to record the contribution of individuals who participated in this arduous exercise. This is a unique document, in the sense that, as the byline under the write-up for each item indicates, it has been possible to pool the expertise available in different departments of NCERT. It has also been possible to exploit the experience and expertise of the two national institutions, viz., NCERT and BIS, to finalise it in the present form. Some individuals need special mention in this regard. At the initial stage, when hardly any information was readily available, Dr. (Mrs.) Kamla Arora, Reader in Education, not only put in a lot of efforts but also her academic inputs for the preparation of the list of items and preliminary questionnaire for gathering basic data from the selected schools. The questionnaire then was finalised by the Department of Measurement, Evaluation, Survey and Data Processing and circulated to the States. Subsequently, the burden of collecting, collating and consolidating the vast amount of information pouring in from various sources fell on the shoulders of Dr. Daljit Gupta, Reader in Education, DPSEE, the convenor of the committee on OB at NCERT. Shri R.K. Sharma, PA and Ms. Reena Kapoor, Steno-cum-Wordprocessing Operator on the daily wage in DPSEE did a magnificent job of preparing the MS of this document.

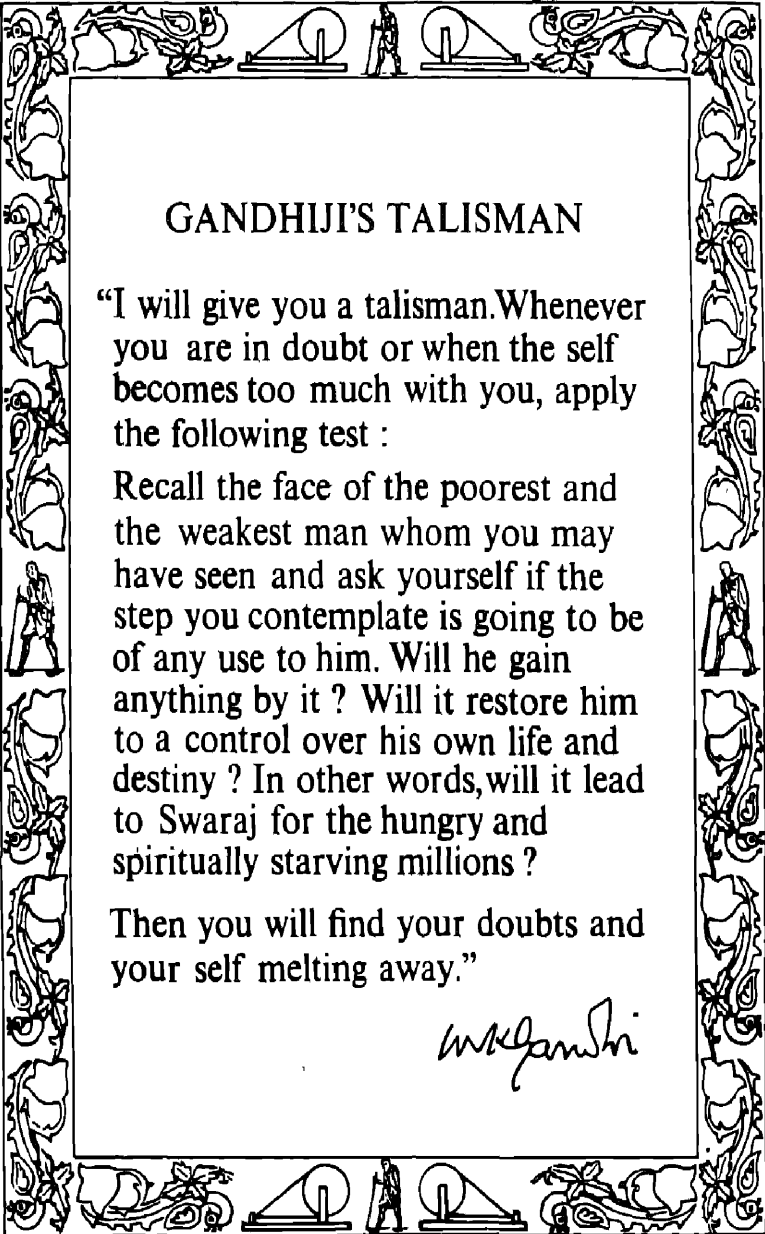
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Director

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GANDHIJI'S TALISMAN

“I will give you a talisman. Whenever you are in doubt or when the self becomes too much with you, apply the following test :

Recall the face of the poorest and the weakest man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will he gain anything by it ? Will it restore him to a control over his own life and destiny ? In other words, will it lead to Swaraj for the hungry and spiritually starving millions ?

Then you will find your doubts and your self melting away.”

M.K. Gandhi

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Teacher's Materials

1.1 SYLLABI

1.1.1 Number/Quantity

One set each for Language, Mathematics, Environmental Studies I & II (Social Sciences and Science), Work Experience, Art Education and Health and Physical Education for Classes I to V.

1.1.2 Description/Explanation

A syllabus is described as a condensed outline or statement of the main points of a course of study or books or other documents. It is necessary that such outlines for all the prescribed courses/learning areas/subjects should be available to teachers as reference in the school.

1.1.3 Specifications

1.1.3.1 *Content*.

A syllabus should:

- state clearly the general and specific objectives (i.e., Minimum Learning Outcomes [MLOs]) to be attained in respect of each subject.
- indicate the topics/points of content related to each of the objectives.
- spell out related common core components.
- contain broad guidelines for curriculum transaction and suggestions for assessment/evaluation.
- serve as a good guide to teachers.

1.1.3.2 *Printing and Production*

- should be printed on good paper to last a cycle of 5 years' implementation of the new curriculum.

ADDITIONAL INFORMATION

- Syllabi developed by the concerned departments such as Directorates of Education, SCERTs, SIEs, etc. under the State Ministry of

Education should be supplied.

- Syllabi developed by NCERT may also be provided for reference.

1.2 TEXTBOOKS

1.2.1 Number/Quantity

One set as indicated—Textbooks of Language and Mathematics for Classes I to V, i.e., (10 books); of Environmental Studies I and II for Classes III, IV and V (6 books); Total 16 books.

1.2.2 Description/Explanation

Textbook is appropriately referred as “a manual of instruction”. It, therefore, deals with a definite subject of study, systematically arranged, intended for use at a specified level of instruction, and used as a principal source of study material for a given course. It is common knowledge that in India it becomes, more often than not, the *only* source of study/reference for all concerned—pupil, teacher, parents and examiner. In view of this, it is necessary that the textbooks for primary education are carefully brought out.

1.2.3 Specifications

1.2.3.1 Content

A textbook should:

- cover all objectives (Minimum Learning Outcomes) and related content, including common core components, spelled out in the syllabus prescribed by the State/UT.
- have systematically and sequentially arranged chapters, in order of difficulty and complexity of ideas/concepts. Within each chapter, small content at a time should be presented in a graded and sequential order.
- contain absolutely accurate content/subject matter.
- be adequately and imaginatively illustrated, preferably in two or multi-colours.
- have sufficient directions for teachers for its proper use.

1.2.3.2 Size

- be easy to handle. A crown-quarto size would be preferable.

1.2.3.3 Printing and Production

- type size in English be 18 pts. for Classes I & II; 14 pts. for Classes III & IV; 12 pts. for Class V. Type size in Regional Languages may be 30 pts. for Classes I & II; 20 pts. for Classes III & IV; 16 pts. for Class V.
- be well-bound to withstand rough handling by children for at least

- three successive years.
- be attractive.

ADDITIONAL INFORMATION

- Textbooks developed by the State/UT Textbook Bureaus should be supplied.
- Textbooks brought out by NCERT may also be supplied for reference.

1.3 TEACHER'S MANUALS

1.3.1 Number/Quantity

One set of the following—Teacher's Manuals for Environmental Studies for Classes I & II; for Work Experience, Art Education and Health-Physical Education for Classes I to V.

1.3.2 Description/Explanation

Although more emphasis has been put on child-centred education, the role of teacher in the early childhood education cannot be overlooked. The child entering Class I, particularly the first generation learner, needs a lot of help for smooth transition from an informal home-climate to a formal school-climate. In the areas of learning, he/she is fully dependent upon the teacher. Thus the teacher requires a lot of help in the form of guides, aids, references, etc. for guiding the pupil's growth and development. The teacher's manuals serve this purpose and are indispensable aids for him/her. Thus, a teacher's manual is defined as a guide containing instructions for teachers including aids, references and related topics of interest in a given subject-matter field.

1.3.3 Specifications

1.3.3.1 Content

A teacher's manual should:

- explain citing concrete example as how to—(a) define/select a Minimum Learning Outcome, (b) derive/select related content/common core component from reference books, life situations, (c) contrive/select teaching-learning activities and (d) frame and use various modes/procedures/tests for evaluating the progress of children towards the attainment of objectives initially set.
- contain a list of teacher-pupil activities as well as suggestions for adoption/adaptation to suit various local situations.
- include an adequate number of test items for day-to-day use alongwith suggestions for developing various types of test items such as short answer, objective type, etc..

- provide a list of audio-visual aids and sources where they can be borrowed or obtained.
- be illustrated wherever necessary.
- describe/explain ways and means of preparing low cost audio-visual aids, using locally available resources.

1.3.3.2 *Size*

- be in any size, provided it has a manageable volume.

1.3.3.3 *Printing and Production*

- have 10 pts. type size in English and 12 pts. type size in Regional Languages.
- be well bound for longer duration.

ADDITIONAL INFORMATION

- Teacher's Manuals developed by State/UT Textbooks Bureaus should be supplied.
- Teacher's Manuals brought out by NCERT may be supplied for reference.

Classroom Teaching Materials

2.1 WALL MAPS

- a. World; b. Country; c. State, and d. District.

2.1.1 Number/Quantity

One each.

2.1.2 Description/Explanation

Maps are flat drawings representing areas of land, countries, the world, the heavens, etc. A dot fixes the location of a city. A line of one dimension/type means a highway, another represents a political boundary, still others designate rivers, railroads, trade routes, elevation and natural boundaries between water and land, contours, direction or other features. Colours separate land, water, etc. and, on the land, plains and higher ranges, etc.

2.1.3 Specifications

2.1.3.1 Content

Maps should :

- be approved by the Survey of India and a footnote to this effect be published.
- contain the latest political boundaries, names of states, capitals, important towns, rivers, mountains, etc.

2.1.3.2 Material

- be on maplitho paper. One ream paper measuring 75cm × 100 cm should weigh at least 31 kg.
- be mounted on a good quality cloth, whose mesh should be at least 12 threads in a centimeter.
- be fixed to the roller by a tape which should be at least 1 cm wide. The wooden roller should be straight and sturdy enough to hold the map. The thumb nails fixing the tape and the map should be not more than 10 cm apart.

- should be varnish washed.

2.1.3.3 *Size*

- Minimum 75 cm×100 cm.

2.1.3.4 *Printing and Production*

- be multicoloured.
- (the main features should) be visible from the back rows of the classroom (approximately 5 to 6 metres distance). Names and other data (information/details) should be legible on all background colours, specially on the dark coloured portions of the map. There should be a printed guide to the map symbols.
- not contain information/details and symbols that are not required in pupils' study.

ADDITIONAL INFORMATION

Maps of India are published by the Survey of India. They have published the following maps:

- Large size multicoloured maps (183 cm×165 cm) of India and adjacent countries.
- Showing state and district boundaries.
- Showing roads, railways, principal industries, minerals, geology products, etc.
- State maps, guide maps of cities/towns like Abu, Agra, Allahabad, Almora, Aligarh, Bangalore, Chandigarh, Delhi, Hyderabad, Kanpur, Kulu, Lucknow, Mathura, Mussoorie, Pondicherry, Secunderabad, Simla, Trivandrum, Madras, Pune, Varanasi, etc.
- Outline maps of varying sizes indicating—
(a) plains (b) boundaries and (c) major rivers.

Printing of all geographical maps, bulk of topographical and extra-departmental maps is carried out in the Map Publication Directorate, which controls the Map Record and Issue Office at Dehradun. In addition, this Directorate is responsible for certification of external boundaries and coastlines of India, appearing on all private and official publications as well as for transliteration of names. For further inquiries one should write to :

The Director
Map Publication
Survey of India
Hathibarakla Estate
Post Box No. 28
Dehradun 248 001

These may be purchased from authorised Maps Sale Agents in important cities and towns and can also be obtained from the following:

- * Offset-in-charge
Map Record and Issue Office
Map Publication Directorate
Survey of India
Hathibarkala Estate
New Cantt. Road
Dehradun 248 001
(Main supplier of maps)
- * Office Superintendent
Map Sales Office
Survey of India
Janpath Barrack 'A'
First Floor
New Delhi 110 001
- * In-charge
Map Sales Office
Southern Circle
Survey of India
No. 81 Richmond Road
Bangalore 560 025
- * Director
Eastern Circle
Survey of India
13, Wood Street
Calcutta 700 016
- * In-charge
Map Sales Office
Survey of India
B Block
Huda Complex
Taranaka
Hyderabad 500 027
- * Director
South Eastern Circle
Survey of India
83-A B.J.B. Nagar
Bhubaneshwar 751 014

- * In-charge
Map Sales Office
C/o 89 (P) Party (CC)
Survey of India
E-6/1, Arera Colony
Bhopal 468 014

2.2 GLOBE

2.2.1 Number/Quantity

One.

2.2.2 Description/Explanation

A globe is a spherical model of the earth or its representation with map on surface. A globe has four features : area, distance, direction, and shape of land and water regions on all parts of its surface. Four types of globes are useful for school education, viz., (a) Physical (b) Political (c) Physical and Political, and (d) Outline globe.

2.2.3 Specifications

2.2.3.1 *Content*

A globe should :

- be approved by the Survey of India and a note to that effect be given.

2.2.3.2 *Material*

- be sturdy.
- be made of pressed strawboard, chromium plated sheet or rigid plastic.
- be mounted on a heavy metallic base and chrome plated metallic arc.

2.2.3.3. *Size*

- be 30 cm. (Globe is usually measured in centimeters).

2.2.3.4 *Printing and Production*

- be multicoloured.
- show ocean relief in many shades of blue, woodlands in light to dark tones of green, steppes and deserts in yellow and arctic ice in white. It will be more useful, if the flat maps have identical colours. Then the transition to flat maps will be easier for the young learners.
- (on a 30 cm globe) the ocean and continents should be printed in at least 48 pts, seas, mountain ranges and big countries in 36 pts, meridians, longitudes and names of other imaginary lines in 24 pts,

capitals in 14 pts and important cities in 12 pts. The main features of the world map should be visible in a radius of 2 metres when the teacher holds the globe in the centre of the class.

- be varnish coated the durable.

2.3 EDUCATIONAL CHARTS

2.3.1 Number/Quantity

One set each of :

Charts for—(a) Language (conversation/reading readiness/others) (b) Environmental Studies I (Social Sciences), Environmental Studies II (Science, including Nutrition-Health Education).

2.3.2 Description/Explanation

A chart is also a kind of map. Charts other than the maps (see details in 2.1) contain information in the form of tables, diagrams, illustrations, etc. and present combinations of pictorial, graphic, numerical and/or verbal material. They are available in loose sheets as well as in bound sets in different sizes.

2.3.3 Specifications

2.3.3.1 Content (General)

A chart should :

- be accurate and upto-date.
- be presented in bold letters.
- have visuals that should be clear and understandable to the child.
- be as illustrative as possible.
- be simple and, as far as possible, present one main idea.
- not be crowded with too many items/information or details and be easy to read.
- colour may be used wherever appropriate and possible.

[See Annex A for some messages and suggestions for content]

2.3.3.2 Material

- be on maplitho paper. One ream paper measuring 75 cm×100 cm should weigh at least 31 kg.
- be mounted on a good quality cloth, whose mesh should have at least 12 threads in a centimetre. The wooden rollers should be straight.
- be fixed to the roller by a tape which should be at least 1 cm wide. It should be sturdy enough to hold the chart. The thumb nails fixing the tape and the chart should not be more than 10 cm apart.
- (if paper sheet used) be with metal binding; or should be on plastic

laminated sheets with metal binding or plastic spiral binding; or should be mounted on cloth with wooden rollers and varnished.

2.3.3.3 *Size*

- flip charts be of small size like 37 cm×50 cm or 50 cm×75 cm.
- wall charts be of big size, preferably 100 cm×150 cm.

2.3.3.4 *Printing and Production*

- be multicoloured [visuals should be discernible at a distance. The letters should be bold so that they are clearly visible from a distance of 5-6 metres.]

ADDITIONAL INFORMATION

Charts prepared by NCERT in different areas such as Environmental Studies, Nutrition and Health Education and others may be referred to.

T R. BAWA

S P MULICK

ANNEXURE A

Some Messages and Suggestions for Content

- * Major food groups and what they do (Energy giving, growth promoting and protective foods).
- * Yellow fruits and vegetables and green leafy vegetables keep your eyes shiny and bright.
- * Use clean and safe water for drinking and cooking.
- * Keep house and surroundings clean.
- * Prevent pollution of water.
- * Make compost-pit to dispose of garbage.
- * Plants and animals are adapted to their surroundings. (Desert and aquatic plants and animals).
- * Our common medicinal plants (Tulsi, Neem, Vasak Bel alongwith a brief write up on their medicinal properties).
- * Wild life our national pride—preserve them. (National animal, national bird, and national flower, inset in the map of India, location of important wild-life sanctuaries, protecting endangered species).
- * Our solar family.
- * Solar and lunar eclipses.
- * Our artificial satellites (Aryabhata, Rohini, INSAT 1B or 1C).
- * Our historical monuments.
- * Our national leaders, freedom fighters, scientists, artists, etc.
- * Our festivals.
- * Costumes of people of different regions.
- * Types of houses built in different parts of the country.
- * Growth of early civilization.
- * Alphabets.
- * Illustrative stories for conversation.

[These are only suggestions. Other content may be selected from the State syllabi and textbooks. Teacher and pupils may prepare their own charts in Art Education and Work Experience periods.]

G. GURU
S. BHATTACHARYA
S.H. KHAN

Play Materials

3.1 BLOCKS, STRIPS AND TILES

3.1.1 Number/Quantity

Three different types of sets, containing adequate pieces and accessories, i.e., 20+.

3.1.2. Description/Explanation

It is necessary to highlight the need for using a variety of play materials in form of blocks, games, toys, puzzles, etc. in creating a child-centred classroom. Special mention has been made here, for, far too much emphasis has been laid on 'teaching' rather than 'learning' in the formal system, mostly using the textbook. Play materials serve a dual purpose, i.e., recreation and education at the same time, thereby creating informal and relaxed atmosphere for facilitating learning by young children.

At present, a variety of play materials are available in the market, mainly in cities. There is a wide scope for selection from among these. Suggestions for only three types have been made. Even within a type, a variety of materials are available. A judicious choice, using the specifications mentioned below, should be made. Pattern blocks are solid or hollow pieces in different well defined shapes and sizes, and are generally made of wood or plastic. Strips generally used for *mechanical* construction, of things/objects/devices, are made of metals, plastic and wood. Tiles are generally made of ceramics. However, innovations are being made in using materials such as rubber, foam rubber, plastic, etc.

Lest the purpose of this recommendation is misconstrued, it is necessary to clarify that NCERT firmly believes in preparing and using such teaching aids from locally available materials, wherever and whenever possible.

3.1.3 Specifications

3.1.3.1 Content

Blocks, Strips and Tiles should :

- provide opportunities to build or construct things, objects, figures,

habitations, mosaic, designs, patterns, configurations, etc.

- have minimum 10 stimulus cards for construction along with a manual giving clearcut directions and explanations.
- be preferred if they offer more possibilities of outputs, with less cost.
- be appropriate to the age group, i.e., 6 to 11 years.
- be related to concepts to be developed, in respect of various learning areas.

3.1.3.2 *Material*

- be made of sturdy and durable material [*In view of the national concern for preserving forests, plastic, rubber, ceramics, etc. be preferred to wood.*]
- (sheets of flexible plastics) be without any backing and have a minimum thickness of 0.038 mm (IS : 9873 [Part 1]—1981).
- (wood) not display any insect holes and any knots be not loose (IS : 9873 [Part 1]—1981).
- have fast, non-toxic colours.

3.1.3.3 *Size and Shape*

- be easy to handle and suitable (IS : 9849—1981).
- have a variety of shapes.
- not to exceed 10 sq. centimetres or below medium-sized.
- (strips) have necessary nuts, bolts, screws, spanner, etc.
- pointed ends of screws, nails and other similar fasteners be not accessible. (IS : 9873 [Part 1]—1981).
- (accessible) edges be so designed as to reduce risk of injury (IS : 9873 [Part 1]—1981).

3.2 JIGSAW PUZZLES

3.2.1 *Number/Quantity*

Six different types of sets : (a) three sets of 4-6 pieces in each set; and (b) three sets of 10-20 pieces in each set.

3.2.2 *Description/Explanation*

Jigsaw puzzles are pictures stuck on board and cut into interlocking pieces with jigsaw. They vary from simple to complex in design. A simple one may consist of 3 or 4 pieces, while a complex one may comprise 10-20 pieces in each set.

3.2.3 Specifications

3.2.3.1 Content

Jigsaw Puzzles should :

- have pictures, figures, designs of things, objects, animals (birds, insects, reptiles, pet and wild animals, etc.), mathematical concepts, etc., preferably of those available in the child's own environment.
- include stimulus cards as prompts and manuals with detailed explanations and directions.
- be arranged in order of increasing complexity.

3.2.3.2 Material

may be in plywood, hardboard, plastic, rubber, foam rubber, and ceramic. [Use of *wood* is discouraged.]

- (sheets of flexible plastics) be without any backing and have a minimum thickness of 0.038 mm (IS : 9873 [Part 1]—1981).
- be sturdy and durable.
- (wood) not display any insect holes and any knots be not loose (IS : 9873 [Part 1]—1981).
- (surface of wooden material) be not rough to such an extent that risk of injury from splinters may result (IS : 9873 [Part 1]—1981).

3.2.3.3 Size

- (pieces) not be too small.
- be easy to handle and suitable (IS : 9849—1981).
- be cut to precision for perfect match and fit into the base board.
- (accessible) edges be so designed as to reduce risk of injury (IS : 9873 (Part 1)—1981).

3.3 GAMES AND TOYS

3.3.1 Number/Quantity

Two sets : each set of toys should include (a) two Dolls (one male and one female); (b) Doll's Kitchen set; (c) Doctor's set; (d) Carpenter's set; (e) Animals's set (zoo); (f) Board games such as Ludo, Snakes and Ladder, Food Tray, etc; Movement toys, (implying scientific principles); and Mechanical or Battery Operated toys.

3.3.2 Description/Explanation

These sets of materials have been recommended with a special objective in view. Play is an intuitive activity of a child and, hence, educators have given

great importance to play in developing child's personality. Although, play is a "pleasurable activity carried on for its own sake, without reference to ulterior purpose or future satisfaction" (Good, C.V., 1959), play such as associative play, dramatic play, free play, organised play, supervised play, pattern block play, etc., have been found to help knowledge, skills and socio-emotional and moral development of children. Since a large majority of first generation learners from disadvantaged sections of the society will be enrolling in the primary school, it is imperative that they are carefully exposed to these materials. They should be encouraged to freely interact with them for a smooth transition from informal/non-formal situation to formal instruction gradually.

3.3.3 Specifications

3.3.3.1 *Content*

- depict/present real life situations relevant to diverse groups of children.
- represent/cover a variety of social situations.

3.3.3.2 *Material*

Dolls material

- may be in plastic, rubber foam, rubber and cloth.
- be not soluble (basic material). (IS : 9873 [Part 1]—1981).
- be bright and colourful (IS : 9849—1981).
- (stuffing material) be new or disinfected. (IS : 9873 [Part 1]—1981).
- (stuffing material) shall not contain any hard or sharp objects. (IS : 9873 [Part 1]—1981).
- (the stitching) be very strong and shall not open under normal use. (IS : 9873 [Part 1]—1981).

Dolls' Kitchen set

- be in aluminium, steel or wood. (The set contains miniaturized kitchen utensils).
- (accessible) edges be so designed as to reduce risk of injury. (IS : 9873 [Part 1]—1981).
- be in colour.

Doctors' set/Carpenters' set

- it comes in a cardboard box. The doctors' set is usually in rubber and plastic. The carpenters' set includes miniaturized tools which may be in wood and metal.
- (accessible) edges be so designed as to reduce risk of injury. (IS : 9873 [Part 1]—1981).

Movement toys

- may be in plastic or good quality metallic sheets. (IS : 9873 [Part 1]—1981).
- be brightly coloured. (IS : 9849—1981).
- be exact replicas of the original to give the children the correct concept.
- driving mechanisms be so enclosed that moving parts liable to jam the fingers or otherwise injure, cannot be touched. (IS : 9873 [Part 1]—1981).
- edges be so designed as to reduce risk of injury (IS : 9873 [Part 1]—1981).
- edges be protected by a plastic coating or by paint (IS : 9873 [Part 1]—1981).

Board games

- be made of hardboard or metallic sheets and counters may be in plastic.
- (surface) be not rough to such an extent that risk of injury from splinters may result. (IS : 9873 [Part 1]—1981).

Games Equipment

4.1 SKIPPING ROPE

4.1.1 Number/Quantity

Ten

4.1.2 Description/Explanation

Running, jumping, chasing, climbing, dodging activities are commonly indulged in by the children of 6 + to 11 + age-group. Rhythmic activities, imitation, folk dance, story, plays, stunts, dramatic activities, etc. are liked by them. They are fond of games of *low organisation* and other games using implements and balls. Apparatus like sea-saws, jungle-jim, swings, slides, ladders, ropes, etc. satisfy them most.

Ropes provide an ideal activity for them. Skipping is an activity in which *muscular co-ordination*, specifically of hand and leg co-ordination is developed. It increases and builds up stamina alongwith *cardio-vascular endurance*. Rope skipping is an ideal example of a health-cum-recreational-cum-low organisational activities.

4.1.3 Specifications

4.1.3.1 Content Nil

4.1.3.2 Material

Ropes may :

- be made of cotton, plastic, coir or any other material.
- have a handle—wood/plastic at each end.

4.1.3.3 Size

- be 235 cm to 300 cm long.
- be 2 cm to 4 cm thick.

4.2a BALLS—RUBBER/TENNIS BALLS

4.2.1a Number/Quantity

Ten

4.2.2a Description/Explanation

Rubber or tennis ball is a multi purpose game equipment. In individual games, the ball can be thrown at a distant-target to improve marksmanship. Team games like cricket, hockey, tennis, or just plain throw-and-catch are very popular. Playing with a ball helps build manipulative skills of young children. These games also help in developing the *hand-eye co-ordination*.

4.2.3a Specifications

4.2.3.1a Content Nil

4.2.3.2a Material

Balls should :

- (tennis) be made of rubber covered by a soft felt.
- be made of plastic or Indian rubber.

4.2.3.3a Size and Shape

- have a uniform outer surface. (If there are any seams, they shall be stitchless). (IS : 2216—1985).
- diameter of the ball be 63.5 to 66.7 mm (IS : 2216—1985).
- mass be between 56.7 g to 58.5 g (IS : 2216—1985).
- bounce of 135 cm to 147 cm when dropped from a height of 254 cm on a 1:3:6 concrete base of 76 mm thickness (IS : 2216—1985).

4.2.3.4a Colour

- be white or yellow in colour. (IS : 2216—1985).

ADDITIONAL INFORMATION

- be stored under day conditions away from sunlight and dust.
- be packed in a weather-proof manner such as in sealed polyethylene bags or air tight tin containers. (IS : 2216—1985).
- be marked with manufacturer's name or his registered trade-mark and on the inner side be marked with manufacturer's code mark indicating

the date of manufacture. The containers be marked with the quarter and year of manufacture of the balls. (IS : 2216—1985).

4.2b BALLS—THROWBALL (VOLLEYBALL)

4.2.1b Number/Quantity

One

4.2.2b Description/Explanation

It is made of a rubber bladder covered with a leather case. Air is filled in the rubber bladder till it fits tight against the leather. It is a large ball that can be used to play games like throwball, dodgeball, volleyball, or any innovations one can think of such as passball. It is larger than the tennis ball and it requires the use of both hands. Usually team games are played with this ball. It helps to develop a spirit of cooperation. In a game like dodgeball, it develops power of concentration and quick reflexes.

4.2.3b Specifications

4.2.3.1b Content Nil

4.2.3.2b Material

A throwball should :

- be manufactured from butt portion of tight textured cowhide or buffalohide (IS : 417 [Part 2]—1986).
- be free from flay cuts and grain defects (IS : 417 [Part 2]—1986).
- be vegetable/semi-chrome or chorme tanned (IS : 417 [Part 2]—1986).
- suitable fungicides be incorporated for all types of leather at the end of tanning operation and before drying (IS : 417 [Part 2]—1986).
- be dyed in any colour (preferably uniform light colour) or pigmented (IS : 417 [Part 2]—1986).
- average thickness of leather panels be not less than 1.7 mm when measured on any four panels of the volleyballs (IS : 417 [Part 2]—1986)

4.2.3.3b Size and Shape

- be spherical in shape with a circumference of 65 to 67 cm when inflated to an air pressure of 0.40 to 0.45 bar (0.40 to 0.45 kgf/cm²). (a tolerance of 1 percent in the circumference on sphericity be allowed) —(IS : 417 [Part 2]—1986).

- mass (with inflated bladder) be 260 to 280g (IS : 417 [Part 2]—1986).

ADDITIONAL INFORMATION

- (each ball) bear the manufacturer's name, initials or trade-mark (IS : 417 [Part 2]—1986)
- (each ball) be first wrapped in polyethylene cover and then packed together with other balls similarly wrapped (IS : 417 [Part 2]—1986).

4.2c FOOTBALL

4.2.1c Number/Quantity

One

4.2.2c Description/Explanation

It is a large ball, spherical with good bounce. It is made of a rubber bladder covered by brown leather. Air is filled in the rubber bladder. Football helps develop muscles of the legs. It also, develop, eye-leg co-ordination, strength and stamina. As a team game, it helps in developing co-ordination, co-operation, good-will and loyalty in players.

4.2.3c Specifications

4.2.3.1c Content Nil

4.2.3.2c Material

A football should :

- be manufactured from butt portion of tight textured cowhide or buffalohide (IS : 417 [Part 1]—1974).
- be free from flay cuts and grain defects (IS : 417 [Part 1]—1974).
- be vegetable/semi-chrome or chrome tanned (IS : 417 [Part 1]—1974).
- be dyed in any colour (preferably brown, cream or white) (IS : 417 [Part 1]—1974).
- suitable fungicide be incorporated into the leather at the end of tanning operation and before drying (IS : 417 [Part 1]—1974).
- average thickness of leather panels be not less than 2.5 mm when measured on any four panels of the footballs (IS : 417 [Part 1]—1974).

4.2.3.3c Size and Shape

- be spherical in shape with circumference of 68-71 cm when inflated to an air pressure of 0.98 bar (1 kgf/cm²) (a tolerance of 1 percent in the circumference on sphericity be allowed) (IS : 417 [Part 1]—1974).
- weight be 397 to 454 g (IS : 417 [Part 1]—1974).

ADDITIONAL INFORMATION

- (each ball) bear the manufacturer's name, initials or trade-mark (IS : 417 [Part 1]—1974).
- (each ball) be wrapped in a polyethylene cover and then packed together with other balls similarly wrapped (IS : 417 [Part 1]—1974).
- should be stored in cool, dry place, away from sunlight, water and dust

4.3 SWING ROPE WITH TYRE

4.3.1 Number/Quantity

One

4.3.2 Description/Explanation

Swing rope has potential for innovating a number of individual activities. A rope is needed to which a tyre is tied. The tyre should be broad enough to permit the children to pass through it easily. The rope may be tied to a branch of a tree or to two poles or whatever suits.

4.3.3 Specifications

4.3.3.1 *Content*

- Rope and tyre (used preferably).

4.3.3.2 *Material*

A rope should :

- be strong.
- be made of cotton, coir or plastic.

4.3.3.3 *Size*

- be at least 6 to 8 metres long and be so adjusted as to enable the shortest child to reach it and to manipulate it.

4.4 AIRPUMP

4.4.1 Number/Quantity

One.

4.4.2 Description/Explanation

Airpump is used to fill air into the bladders of footballs and throwballs. It consists of a hollow metal cylinder fitted with a piston having a handle. The

is movable along the length of the cylinder. At the other end of the cylinder is a rubber tube used to connect the pump to the bladder of the ball. The cylinder has a valve at the end where the tube is attached. When the piston is pushed towards this end with the help of the handle, the valve opens and allows the air to pass through the tube into the ball. But when the handle of the pump is pulled back, the valve rises to prevent the air filled in the ball from coming out or leaking out. The tube also has a valve.

Specifications

A medium size pump of good quality should be purchased as per specifications given below :

1. *Content* Nil

2. *Material*

- Handle—Plastic or wood.
- Body—strong, durable plastic/iron/steel or any metal

3. *Size*

- Length—38 cm
- Handle—15 cm

RING

1. **Number/Quantity**

Five

2. **Description/Explanation**

The ring is usually made of rubber or plastic and is light in weight. It is a very useful object for the children of age group 6 + to 11 +. Although quite low cost like rubber balls it is a versatile equipment which can help conduct healthy-recreational-cum-low-organizational activities. It has great potential for motivating team games.

4.5.3 Specifications

4.5.3.1 *Content* Nil

4.5.3.2 *Material*

A Ring should :

- be made of rubber/plastic.

4.5.3.3 *Size*

- be (approximately) 4 cm-6 cm in width.

U.S. SHARMA

Primary Science Kit

5.1 PRIMARY SCIENCE KIT

5.1.1 Number/Quantity

One

5.1.2 Description/Explanation

The kit is basically a demonstration science kit for the primary level. It was first introduced in 1970. All States and UTs have been receiving the kit from NCERT in varying quantities and some states getting them produced locally since then. There have been a few revisions in the design meanwhile. The current one has been brought out under the Indo-German Project "IMPROVED SCIENCE EDUCATION IN PRIMARY AND MIDDLE SCHOOLS IN MADHYA PRADESH AND UTTAR PRADESH".

It contains different categories of items like low cost science apparatus, glasswares, chemicals, hand tools and consumable materials for classroom demonstration, experiments and exploration of the environment. Multipurpose specially designed items like globe cum hemispherical mirror, blue flame kerosene burner, laboratory rod with boss head and ring extension, pump, lens, circuit board, lever cum beam balance, etc. offer widest scope of use of the kit. The contents are skin packed in vacuum formed trays in a lockable box made of mild steel sheet. The detachable lid of the box can be combined with the backside of the box to make a chalk-board of 1 metre \times 0.36 metre. It contains a total of 110 items and its weight is 11 kg approximately.

The specifications and technical drawings of the items listed here will be available on request.

5.1.3 Specifications

Items

Quantity

A Measurement, Demonstration, Experiment

A 1 Tailor's Measuring Tape

Plastic coated cotton, flexible, ends stainless steel, 1.5m long, with cm marking on one side in 0.5 cm steps and inch marking on the other side

A 2 Ruler

M.S. sheet, thickness 0.71 mm,

Size 500L (± 0.5 mm) \times 48W \times 11H mm can be used as lever beam balance and optical bench, has holes at every two cms and graduations in alternate black and white in cm strips on the lower side and one bush for pivoting on the upper side.

1

A 3 Plastic Spoon

Polycarbonate,

1cc with 0.5cc mark, transparent, cube shaped,
size of cube 10 \times 10 \times 10mm, +0.1, —0 mm

6

A 4 Disposable Plastic Syringe

Standard,

2 ml with graduation, without needle, transparent

2

A 5 Plastic Beaker

Polypropylene/low density Polyethylene,

100 ml with graduation in steps of 10 ml, translucent, with rim having pouring lip, having 52 mm outer diameter and 65 mm height.

2

A 6 Glass Beaker having pouring lip

Borosil or equivalent,

250 ml with graduation in steps of 10 ml,
outer diameter 68 mm

1

A 7 Measuring Cylinder

Polycarbonate,

transparent, 100 ml with graduation in steps of 1 ml, engraved

1

A 8 Decimetre Cube Vessel

Polycarbonate,

transparent, 1000 ml with engraved markings on two opposite sides, on one side in 1 sq. cm and 1 cm horizontal lines on the other

1

A 9 Cubic Centimetre Block

Polystyrene/ABS,

10 \times 10 \times 10mm (+0, —0.1mm), white and black

5 each

A 10 Spring Balance

Polystyrene/ABS,

250 g, graduated in steps of 10 g, markings engraved, with $\pm 2\%$ accuracy. Overall size 220L \times 57W \times 19.5H mm Open type with plastic body, spring in the groove, adjustable pointer, a hole at the top

1

A 11 Magnetic Compass

High density plastic body.

transparent top, round, with 50 mm diameter, with square cardboard case

1

**A 12 (a) Laboratory Thermometer with
(b) Holder**

Red alcohol in glass with metallic holder, -10 to $+110$ degrees Celsius in steps of 1 degree with accuracy of $\pm 2\%$, diameter 6.3mm, total length 304mm, holder M.S. sheet 330L \times 22W \times 11H mm with two plastic split clamps

1

A 13 Mirrored Plastic Foil

75mm \times 150mm

10

A 14 Globe cum Hemispherical Reflector

Polypropylene,

diameter 150mm in two halves, collar for assembling the two has a hole 5mm diameter and two locking pins of 4.8mm diameter, thickness 2.5mm, one half mirrored inside, milky white surface has outlines of continents, islands, latitudes, arctic circle, topics of cancer and capricorn, antarctic circle in dotted lines, longitudes (one line for every 90 degrees, starting from 0 degree), additional longitude for Jabalpur, surface matt/rough, can be marked by chalk/felt pen

1

A 15 (a) Small Plastic Ball (Moon)

Polypropylene,

41mm diameter, with fixing facility

1

(b) Attachments for fixing A14 and A 15

M.S. wire and plastic (Polypropylene)

1

A 16 Funnel

Polycarbonate,
transparent, inner and outer diameters at the rim 85mm and
90mm, total length 135mm, stem length 50 mm, stem outer
diameter 6.5mm

1

A 17 Y-shape Plastic Tube

Polypropylene,
overall size 40 mm × 20 mm, stem length 25 mm

1

A 18 Electric Circuit Board

Plastic items (a), (b), (c), (d) : High density Polystyrene

- (a) Base plastic, size 195L × 120W × 15H mm,
having 16 banana sockets,
with attachment facility for circuit diagrams on the backside,
- (b) Battery Holder with symbol
- (c) Bulbholder with the provision to attach with reflector of a torch
- (d) Switch press type with symbol
- (e) Multicore Wire with Banana Plugs : 30cm long wire with
banana plugs—3 nos, 17cm long wires with banana plugs—3
nos
- (f) Crocodile Clips — 2 nos
- (g) Torch bulb 1.5 V, screw type

1

A 19 Multipurpose Pump

Polycarbonate/polystyrene transparent body. L.D. polyethylene
piston cap, operating handle polypropylene, two valves with
stainless steel balls, two nozzles, outer diameter of body 30mm,
overall length approx. 200 mm. Can be used as water pump,
syringe, vacuum pump and pressure pump

1

A 20 Wedge/inclined plane and rod stand

Polystyrene high impact, yellow colour,
overall size 200L × 35W × 40H mm, having 4 holes of 8.2mm
diameter for keeping the rods as at A 38

1

A 21 Pulley

High density polyethylene, red, M.S. frame,
0.71mm thick, plated
50mm diameter pulley, overall length 95mm

2

A 22 Mounting Needles with plastic handle

Steel needle, nickel plated.

plastic handle, overall length 106mm 2

A 23 Plastic Tubing

PVC transparent, high flexibility,

6mm inner diameter, 1 metre long 1

A 24 Water Wheel

Wheel Polypropylene red, handle G.I. wire,

2.8mm diameter, overall size

165mm × 110mm × 20mm 1

A 25 Glass Slides

75L × 25W × 1.5mm thickness, smooth corners 6

A 26 Plastic containers with screwed caps having built-in lids

Plastic transparent/translucent,

labelled containers,

32mm square × 80mm height 8 each

A 27 Glass Nozzle

Hard glass,

6mm outer diameter, length 90mm 1

A 28 Hand Lens

Polystyrene,

(a) Plastic frame with holder/attachment for optical bench and
attachment to hold two lenses together, overall size 150mm ×

69mm × 14mm approx.

(b) Glass/plastic lenses, diameter 50mm, F.L. 120mm 6

A 29 Glass Balls (Marbles)

Four sizes, (10mm, 15mm) 10 each

(20mm, 25mm) 5 each

A 30 Test Tubes with rim

Borosil or equivalent,

Outer diameter 15mm, length 125mm 10

A 31 Boiling Tubes with rim

Borosil or equivalent,

Outer diameter 25mm, length 150mm	2
A 32 Kerosene Burner	
M.S. sheet, ebonite heat insulators, double chimney, four wicks, cap of inner chimney fixed, diameter of container 75mm, height 50mm, overall height 140mm approx.	1
A 33 Wire Gauze	
Galvanized wire net 0.71mm diameter, 25 meshes per square cm, size 100mm × 100mm, ends folded	1
A 34 For future inclusion	
A 35 Aluminium Katori with Hanger	
Katori aluminium, hanger G.I. wire 2.8mm diameter, inner top diameter of katori 100mm, taper 8 degrees, height 45mm, 0.9mm thickness	2
A 36 Plane Mirror	
Stainless steel, 145L × 98W × 0.5H mm, high polish	1
A 37 Test Tube Stand	
M.S. sheet 0.56mm thickness, painted, with six holes for test tubes and boiling tubes	1
A 38 Rods	
Iron/M.S., plastic, aluminium, glass, 8mm diameter, length 100mm	1 each
A 39 Ferrite Magnets	
1.25W × 10 H × 52L mm poles marked with red and green colour	1 pair
A 40 Test Tube Holder	
G.I. wire, 2.8mm diameter, overall length 158mm approx., flat tips, to hold test tubes of 15mm to 25mm diameter	1

A 41 Tea Strainer

Plastic, twin net,
96mm diameter, overall length 135mm approx. 1

A 42 Mould for chalk sticks/small candles

Plastic,
made in two halves, inner diameter 13 mm,
overall length 100mm 1

A 43 Super Enamelled Copper Wire

Diameter 0.8mm, 1 metre long 1

A 44 For Future Inclusion**A 45 Drawing Pins**

Standard, in plastic container (A 26) 12

A 46 Iron Nails

(a) 1.4mm diameter \times 25mm long 5

(b) 2mm diameter \times 25mm long 5

(c) 5mm diameter \times 125mm long 1

A 47 Rubber Stopper

(a) for 15mm diameter test tube 3

(b) with two holes, 6mm diameter and 8mm diameter
for 25mm diameter test tube 1

(c) with one hole 6mm diameter
for 15mm diameter test tube 2

A 48 Rubber Sucker

25mm cup diameter without handle 2

A 49 Kitbox

(a) Kitbox with guides/supports for three trays, M.S. cold rolled
sheet 0.63mm, painted, backside of the box and outside of the
detachable lid painted with green board paint, all joints are
spotwelded; there are two handles cum support plates, having
provision to hold lab rod, overall size 510L \times 270W \times 360H
mm 1

(b) Trays, plastic vacuum formed,
500L \times 260W mm with varying depth of cavities, skin packed 3

(c) Right angle clamp (boss head), cast iron, painted	1
(d) Multipurpose Ring Extension G.I. wire 5mm diameter, ring inside diameter 69mm, overall length 185mm	1
(e) Laboratory Rod M.S., plated, made of pipe 11mm diameter, 400mm long	1
A 50 Lock and Key Padlock with two keys, size 30mm	1
A 51 Cell No. R20, dry cell 1.5 Volts, leakproof	1
(N. B. Items at A 34 and A 44 will be included later)	

B. Rocks, Mineral Chips in transparent labelled plastic containers with screwed caps (A26)

B 1 Hard Coke	30g
B 2 Mica	20g
B 3 Slate Stone	30g
B 4 White Marble	90g
B 5 Granite	90g
B 6 Lime Stone	90g

C. Chemicals in plastic containers with lid screwed caps, (A26)

C 1 Fertilizer — Ammonium sulphate or Urea	50g
C 2 Fertilizer — Calcium superphosphate	50g
C 3 Glycerine	30ml
C 4 Washing Soda	50g
C 5 Common Salt (mined crystals)	50g
C 6 Potassium Permanganate in crystal form	50g
C 7 Sugar	50g
C 8 Vaseline	30g
C 9 Alum	50g
C 10 Iron Filings	20g

D. Miscellaneous**D 1 Plasticine**

* Good quality, harmless	50 g
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D 2 Cotton Thread

Machine cotton, good quality, 18g spool	1
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D 3 Filter Paper

150mm diameter	12
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D 4 Polyethylene Bags

Leak proof, thick quality. 100mm × 100mm	20
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D 5 Rubber Balloons

Thick quality

(a) approx. dia 200mm when inflated	12
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(b) approx. dia 100mm when inflated	6
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D 6 Rubber Bands

(a) 24mm diameter

(b) 50mm diameter	12 each
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D 7 Sand Paper

(a) rough, no. 60	225mm × 280mm	
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(b) fine, no. 120	225mm × 280mm	1 sheet each
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D 8 Sponge

100mm × 70mm × 40mm	1
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D 9 Candle

13 mm diameter, approx. 100m length	2
-------------------------------------	---

D 10 Wax

In plastic bag	100g
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D 11 Chalk Powder

In Plastic bag	100g
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D 12 Straw Pipes

Plastic, standard size	12
------------------------	----

E. Hand Tools**E 1 Common Handle**

Handle high impact plastic, coloured, with chuck and chuck nut, 100mm length and 20mm diameter 1

E 2 Screw Driver Tip

Tool steel hardened, plated,
110mm long, 6mm diameter, 6mm-blade 1

E 3 Poker/Drill Tip

Tool steel hardened, plated
120mm long 1

E 4 Junior Hacksaw with 5 spare blades steel hardened

Frame of mild steel, plated,
overall size 190mm long and 60mm height 1

E 5 Tin Cutter

Tool steel hardened, plated,
160 mm long, spring backed 1

E 6 Claw Hammer with wooden Handle

250 g, overall size 270mm × 90mm 1

E 7 Blade with Holder

Blade standard, holder plastic,
overall size 66mm × 25mm × 6.5mm 1

E 8 Combination Plier

steel, hardened
handle with plastic sleeve,
overall size 155mm × 55mm 1

E 9 Screw Driver with 3mm-blade, standard

1

F. Charts

Note: All charts of same size (15.5 × 18.5cm). Charts are printed on white polypropylene sheets (0.15mm thickness)

F 1 Special display hanging holder for pieces of charts. Made of PVC transparent, 0.15mm thickness with two partitions, overall size 34cm × 60cm

1

F 2 Young ones with their adults (cow, cat, dog, hen, gram, tree)	6 pieces
F 3 Parts of a flowering plant (mustard plant: flower, stem & leaves, roots)	3 pieces
F 4 Body parts of different animals which help them to move (butterfly, fish, frog, snake, sparrow, human being)	6 pieces
F 5 Homes of various animals (ants, spider, honeybee, snake, woodpecker, lion)	6 pieces
F 6 Eye testing chart	2 pieces
F 7 Different types of seeds with their structures helping in dispersal (seeds with hairs, hooks, spines, thorns, wings, lightweight)	6 pieces
F 8 Human body (internal structure) with sense organs (head, chest, belly)	3 pieces
F 9 Structures of heart (external/internal)	2 pieces
F 10 Environmental pollution (air, water, noise)	3 pieces
F 11 Hydroelectric power station (total plant, details)	2 pieces
F 12 Digestive System (upper/lower part)	2 pieces
F 13 External features of a fish	2 pieces
F 14 External features of toad and jumping frog	2 pieces
F 15 Aquatic plants (hydrilla, trapa)	2 pieces
F 16 Parts of a lotus plant (full plant, fruit)	2 pieces
F 17 Feet of various animals (camel, cow, dog, horse)	4 pieces
F 18 Plants and animals of cold climate (cedar, pine, sheep, yak)	4 pieces
F 19 External features of a flying bird and aeroplane	2 pieces

F 20 Human body skeleton (skull, thorax, legs)	3 pieces
F 21 Balanced diet	2 pieces
F 22 Structures to control water flow (dams, stone walls around well, river bank)	3 pieces
F 23 Terraced cultivation (general diagram, details)	2 pieces

G. Books

G 1 Teacher's Handbook (three volumes, Class III, IV, V)	1
G 2 Kit Manual	1

ADDITIONAL INFORMATION

The kit designed by NCERT may be referred to. For details regarding kit manual, Head, Workshop Department, NCERT may be contacted.

P.K. BHATTACHARYA

V. WEISSER

(German Team Leader)

Mini Tool Kit

6.1 MINI TOOL KIT

6.1.1 Number/Quantity

One

6.1.2 Description/Explanation

Mini Tool Kit is a pack of light duty hand tools which offers majority of basic operations on wood, plastics, soft non-ferrous and ferrous metals. The kit has 34 items of hand tools, marking and measuring tools, first aid and consumables. With this pack the teacher and the student will be able to fabricate apparatus, model, etc. from common materials available in their environment while giving shape to their ideas. The kit measures 270 mm × 175 mm × 80 mm; total weight of the box is 2.8 kilogram. The tools designed for this kit are small and light duty so that the children of Primary Schools can easily handle them. A more professional package called Science Club Kit has been designed for secondary level and onwards.

The Mini Tool Kit will provide the child the first hand experience with tools before he is ready to handle professional tools.

6.1.3 Specifications

6.1.3.1 Content Nil

6.1.3.2 Material and

6.1.3.3 Size

★ Vice

- body, jaws be of cast iron (painted).
- screws, pins, handle be of mild steel (plated).
- size—jaws each 40 mm × 9 mm, maximum opening of moveable jaw 40 mm; overall dimensions with jaws closed 100 mm × 130 mm × 40 mm. The vice is clampable to table top of thickness from 10 mm to 40 mm.

- weight 675 grams approx.
- ★ Half Round Wood Rasp with Handle
 - be of high carbon steel and wooden handle
 - size 150 mm.
- ★ Multitool Body—having a Pipe with Tapered Holder, Plastic head with a washer fitting in the pipe, two screws with wing heads
 - body, screws, washer be of mild steel plated. Head be of high density polyethylene.
 - size—body 20 mm outside diameter 16 mm inside diameter, 135 mm long; hole in the holder portion 6 mm diameter×35 mm deep.
- ★ Carpentry Saw
 - should have steel blade, mild steel shank.
 - size—length 210 mm, 3 teeth/cm duly set, tapering width 15 mm/30 mm, 6 mm diameter×30 mm long shank to fit in the multitool body.
- ★ Carpentry Chisel
 - be of steel (hardened).
 - size—bit 9×3 mm, overall length 65 mm; 6 mm diameter shank to fit multitool body.
- ★ Screw Driver
 - be of steel (hardened).
 - size—5 mm wide tip, overall length 65 mm, 6 mm diameter shank to fit multitool body.
- ★ Triangular File
 - be of high carbon steel, single cut.
 - size 100 mm long.
- ★ (a) Collet.
 - be of mild steel.
 - capacity to hold drill upto 6 mm diameter, 6 mm diameter×30 mm shank to fit multitool body.
- (b) Flat Drill—two
 - be of mild steel or made out of iron nails by flattening pointed end in cold condition.
 - size 3 mm (made out of 2 mm diameter×45 mm long nail); 5 mm (made out of 3 mm diameter×55 mm long nail).
- ★ Junior Hacksaw
 - frame be of mild steel, plated; blade be of steel (hardened).
 - size—frame 6 mm diameter rod, overall length 250 mm; blade 6 mm width×150 mm long.
- ★ Blade for Junior Hacksaw (spare)—four
 - be of steel (hardened).

— size 6 mm width \times 150 mm long.

★ (a) Hammer with Handle

— should have mild steel head and handle, plated.

— size—cross pein hammer 15 mm \times 15 mm bottom, handle 6 mm sq \times 205 mm long, one end is welded to hammer head and the other end is a screw driver tip.

— weight 160 g

A 10 mm \times 10 mm \times 25 mm plastic slider slides with friction on the handle. It has a hole 2.8 mm diameter at the top for suspending the hammer assembly.

(b) Pin

— be of G.I. wire.

— size 3.5 mm diameter wire bent into 'L' shape—40 mm \times 80 mm.

(c) Wire Suspension and Pan

— be of G.I. Wire Plastic Pan.

— length of suspension 130 mm, pan diameter 83 mm and depth 12 mm.

★ Tin Cutter cum Pliers

— be of steel.

— size—200 mm long tin cutter, plier jaws are welded on both arms of tin cutter at a distance of 55 mm from the hinge at right angles to the plane of the tin cutter.

★ Bicycle Wrench

— be of mild steel, plated.

— size 150 mm overall length.

★ Steel Ruler

— be of stainless steel.

— size 150 mm long, standard with mm and inch graduations.

★ Divider

— be of mild steel, plated.

— size 100 mm long, standard as used in a geometry box.

★ Centre Punch

— be of steel (hardened).

— size 6 mm diameter \times 75 mm long to fit in the multitool body.

★ Magnet—one pair

— be of ferrite.

— size 5 mm \times 10 mm \times 18 mm long, lengthwise magnetised, poles marked N and S.

★ Soldering Iron

— 25 watts, standard with screwed cap cum handle complete with 2 metre lead and plug.

- ★ Connecting Wire with Crocodile Clips at both ends—six
 - wire—single core PVC coated 23/76 flexible wire with copper conductor; crocodile clips of mild steel, plated.
 - size—Wire (a) 200 mm long—3 nos. (b) 300 mm long—3 nos. Crocodile clips 50 mm long.
- ★ Cell Holder — one
 - plastic body, brass/copper terminals (plated)
- ★ Polyfab Bag
 - be of polyfab.
 - size 320 mm×250 mm with seven pockets, foldable.
- ★ Container Box—with one handle, a pair of hasp and staple and one partition; all joints are spot welded. The lid is detachable
 - be of mild steel cold rolled 0.4 mm sheet, painted.
 - overall size 270 mm×175 mm×80 mm.
- ★ Wooden Screw—two
 - size 30 mm.
- ★ Wire/Ply nails, assorted
 - quantity 25 g.
- ★ Sand Paper—one sheet
 - No 0.
 - size 230 mm×140 mm.
- ★ Emery Paper—one
 - fine quality, size 230 mm×140 mm.
- ★ Soldering Wire
 - quantity 5 g.
- ★ Soldering Paste in Plastic Container
 - quantity 2 g.
- ★ Dettol in plastic/glass bottle.
 - quantity 5 ml.
- ★ Cotton Surgical
 - quantity 10 g
- ★ Grease in plastic container
 - quantity 20 g.

ADDITIONAL INFORMATION

Majority of tools and all consumables in the kit are readily available from market. As such the school can assemble those in the form of a kit with the help of above specifications. Centrally such kits could be got assembled by the SCERTs/SIEs/SISEs/DEOs with the help of local industries.

For further details Head, Workshop, Department, NCERT may be contacted.

P.K. BHATTACHARYA

Mathematics Kit

7.1 MATHEMATICS KIT

7.1.1 Number/Quantity

One

7.1.2 Description/Explanation

The Mathematics Kit for Primary Stage may consist of various items useful for teaching concepts in mathematics. Vikram A. Sarabhai Community Science Centre, and National Council of Educational Research and Training have designed prototypes of seven items for teaching some of the concepts of mathematics. For the guidance of the teachers, a manual on how to use these items has also been developed by NCERT. Many more items can be included in the kit as and when required.

7.1.3 Specifications

7.1.3.1 *Content* Nil

7.1.3.2 *Material and*

7.1.3.3 *Size*

- all the items can be got made out of wood/ply or plastic.
- ★ Dominoes—a set of 55 dominoes
 - shape of each domino be rectangular.
 - length of each domino be twice the breadth, e.g., 8 cm × 4 cm.
 - each domino be divided into 2 squares. On each square, holes varying from 0 to 9 are made. Square having no hole is considered as a square with 0 hole.
- ★ Cuisenaire Strips—set of 10 rectangular strips in a box
 - length of strips vary from one unit to ten units.
 - central strip marked with numbers 1 to 20 be fixed in the middle of the box. It has two grooves on either side for placing the strips. Width of each groove be such that the strips can be easily placed in.

- ★ **Napier Strips**—a set of 10 rectangular strips in a box
 - length of each strip be 10 times its breadth.
 - 9 strips be of same colour and one of different colour.
 - each strip be divided into 10 equal parts to form 10 equal squares. Each square is divided into 2 triangles by joining left to right diagonal of the square.
 - on 9 strips of same colour, multiplication tables 1 to 9 (one on each strip) are written starting from the bottom. On the 10th strip numbers from 1 to 9 starting from the bottom are written (one in each square) leaving the uppermost square blank.
- ★ **Solids**—set of 5 solids
 - solids be sphere, cylinder, cube, cone and cuboid.
- ★ **Fraction Disc**—a set of 55 inset pieces
 - range of size be $1/10$ th to one whole, i.e., 10 pieces of $1/10$ th size, 9 pieces of $1/9$ th size,, 1 piece of one whole.
 - a square tray with a circular cut-out of the size equal to the piece representing a whole.
- ★ **Cubic Rods**—set of 100 cubic rods
 - rods be of 10 different sizes (10 rods of each size).
 - sizes vary from one cubic cm ($1\text{ cm} \times 1\text{ cm} \times 1\text{ cm}$) to 10 cubic cm ($1\text{ cm} \times 1\text{ cm} \times 10\text{ cm}$).
 - rods be kept in a box.
- ★ **Spike Abacus**—a set of 4 abacuses
 - spikes be fixed on rectangular wooden slabs—4 on first, 5 on second, 6 on third and 7 on fourth slab.

ADDITIONAL INFORMATION

Refer to :

- ★ Vikram A. Sarabhai Community Science Centre (VASCSC), Navrangpura, Ahmedabad and Department of Pre-School and Elementary Education, NCERT for details about the design of the kit.
- ★ Department of Pre-School & Elementary Education, NCERT for details about the manual.

Books For Library

8.1 REFERENCE BOOKS

8.1.1 Number/Quantity

Three

Dictionary—two (one for teachers, one for children), Encyclopaedia—one (preferably in regional language).

8.1.2 Description/Explanation

Reference books are described as ones that are used mainly for the purpose of obtaining, ascertaining the accuracy and reliability of information. The examples are dictionary, encyclopaedia, etc. These are helpful in providing information beyond what is given in textbooks.

8.1.3 Specifications

8.1.3.1 *Content*

- dictionary for children may consist of pictures and words arranged in alphabetical order to help them teach the use of dictionary and to identify words unknown to them.
- dictionary for teachers may consist of sufficient vocabulary required at primary stage.
- encyclopaedia may contain information on subjects in all branches of knowledge (suitable for the age group 6 to 11 yrs); may be in one or more volumes.

8.1.3.2 *Material and*

8.1.3.3 *Size*

- be printed on good quality paper (not less than 70 gsm).
- be easy to handle.

8.1.3.4 *Printing and Production*

- type size be suitable [minimum 12 pt. Devanagari or equivalent for

- children; minimum 10 pt. Devanagari or equivalent for teachers.]
- be hard-bound with cloth/rexin cover.

8.2 CHILDREN'S BOOKS

8.2.1 Number/Quantity

Two Hundred

8.2.2 Description/Explanation

Children's books are described as ones that have graded vocabulary and thought content suitable for children (of a specified age group). These books help children to develop habits of extra reading and self-learning.

8.2.3 Specifications

8.2.3.1 *Content*

Children's books should :

- cover varied areas of interest for children.
- be suitable to the children of 6-11 years.
- be well illustrated and attractive, preferably multi-coloured. [Illustrations should reflect local-specific environment especially human figures.]

8.2.3.2 *Material*

- be printed on good quality paper [minimum 70 gsm].

8.2.3.3 *Size*

- be easily manageable by children, preferably of a size that can fit into a school satchel (bag).

8.2.3.4 *Printing and Production*

- print be of standard size. [minimum range of 20 pt. to 16 pt. Devanagari or equivalent.]
- be centrally stitched/section sewn with cover of pulp board/art paper.

8.2.3.5 *Design*

- be well designed.

ADDITIONAL INFORMATION

- Books for children have been published by National Council of Educational Research and Training, National Book Trust, Children's Book Trust, Publications Division, Ministry of Information and Broadcasting and other institutions all over the country. For list of selected books published by these agencies, refer to Appendix 2.

- For details regarding guidelines for purchase of books (issued by MHRD vide letter No. F. 1-71/87-Sch. II dated August 18, 1988) refer to Appendix 1

8.3 MAGAZINES, JOURNALS AND NEWSPAPERS

8.3.1 Number/Quantity

One each (at available periodicity).

8.3.2 Description/Explanation

A newspaper is a periodical printed in the format of a few large folded sheets, devoted primarily to news and other material of general interest, numbered serially and published at stated intervals, usually daily or weekly in commercial field but fortnightly or monthly in the scholastic field. While a magazine is defined as a periodical in booklet form, usually more literary in tone and more attractively printed and appearing less frequently than students' newspaper. A journal for teachers generally contains articles helpful in the professional growth of teachers.

8.3.3 Specifications

8.3.3.1 *Content*

A Journal/Magazine should :

- have adequately graded information (for children).
- have absolutely accurate information.
- be adequately illustrated wherever necessary.
- have content (for teachers) that may enrich their knowledge.

8.3.3.2 *Material and Size*

- be easy to handle.
- get-up be attractive.
- be printed on good quality paper.

8.3.3.3 *Printing and Production*

- have suitable type size (minimum 12 pt. Devanagari or equivalent for children; minimum 10 pt. Devanagari or equivalent for teachers).

Musical Instruments

9.1 HARMONIUM

9.1.1 Number/Quantity

One

9.1.2 Description/Explanation

India has two main styles of music—Hindustani (North Indian style) and Karnataka (South Indian style). The essential characteristics of the two are basically same. A number of musical instruments are used in Indian music—classical, folk and tribal. These can be divided into four categories—(a) Tara Vadya or Cordo-phones (strings); (b) Sushira Vadya or aerophones (wind); (c) Avanadhya Vadya or membrano phones (drums); (d) Chana Vadya, or idiophones (solid instruments).

Harmonium belongs to Sushira Vadya or aerophones (wind) category. It is easy to learn to play it. It is purely based on 'Saptak' (Seven Swaras) on the basis of which tunes are composed.

9.1.3 Specifications

9.1.3.1 Content and

9.1.3.2 Material

- is made of wood and a number of iron strings attached to the top of wooden tubes.
- has two levels. Upper level of 'Swaras' (wooden tubes) is called black (kala) and consists of 17 tubes. Lower level is known as white (safed) and consists of 25 tubes.
- both levels and iron strings attached to 42 tubes are joined by a wind producing canvas.
- normally the canvas is moved by left hand of the player and swaras are played by the right hand.

9.1.3.3 Size

- standard size available.

9.2 TABLA/DHOLAK

9.2.1 Number/Quantity

One

9.2.2 Description/Explanation

Tabla, the most important accompaniment in classical music, is a pair of kettle drums. It is also called a pair of tuned drums. The right hand drum gives the main tone and sounds high while the left hand drum sounds soft, deep and low.

Tabla is played according to 'raga' and rhythm in the form of 'tala' as 'raga' is an arrangement of musical notes of ascent and descent of 'Saptak' (seven swaras). To become an able accompanist, Tabla player must know classical specifications and all characteristics of music.

Dholak is a drum with elliptical body and two heads and is primarily used to accompany folk dances, folk songs.

9.2.3 Specifications

9.2.3.1 *Content and*

9.2.3.2 *Material*

- Tabla drums are made of wood and leather attached on both sides of the body.
- Upper ends of both drums are covered with hide.
- Dholak is made of wood and both ends are covered with hide.

9.2.3.3 *Size*

- standard size.

9.3 MANJIRA

9.3.1 Number/Quantity

Two pairs

9.3.2 Description/Explanation

Manjira is an instrument which is very handy and easy to manipulate according to rhythm of the music. It is generally used in prayers but it can also be used in other situations such as games songs, ritualistic and festival songs, etc.

9.3.3 Specifications

9.3.3.1 *Content and*

9.3.3.2 *Material*

- has two metallic cymbals attached to each other with a string.

9.3.3.3 *Size*

- diameter (a) 6 cm and (b) 12 cm (one of each size).

R. SAINI

Classroom Equipment

10.1a CHAIR AND TABLE

10.1.1a Number/Quantity

One each per teacher

10.1.2a Description/Explanation

Nil

10.1.3a Specifications

10.1.3.1a *Dimensions of Table*

Width Dimensions of table tops shall be derived from following considerations :

- (a) Minimum width of knee-hole space, plus thickness of legs where applicable; plus
- (b) Minimum width of box for drawers; plus
- (c) Width of overhang, where provided.

Cantilevering of table top on the side and rear be permitted and it shall not exceed 300mm .

Height The height of the table shall be $710 \pm 5\text{mm}$ and the height of seat of chair shall be $430 \pm 5\text{mm}$

10.1.3.2a *Knee Space Dimensions*

Knee Space Width A minimum Knee Space Width of 560mm clear of obstruction shall be provided.

Knee Space Height Knee Space Height shall be made up of the height of the seat of the chair and the vertical clearance between the seat of the chair and the underside of the table. The vertical clearance between the seat of the chair and the underside of the table shall be 230 mm minimum.

the chair and the underside of the table shall be 230 mm minimum.

10.1.3.3a *Dimensions of the Chair*

Effective Depth of Seat Maximum effective depth of seat shall be 450mm. This shall be measured from a vertical line through the centre of the front edge of the seat to a vertical line through the centre of the back edge of the seat.

Seat slope The seat shall be either horizontal or sloping downwards between 2 and 3° from front to back.

Width of seat The minimum width of the seat shall be 450mm measured at a point midway along the effective depth of the seat.

Width Between Arm Rests The minimum distance between the inside the arms should be 460 mm.

Height of the Back Rest The angle between the vertical plane of the back rest and the horizontal plane of the seat shall be 95° to 105°. The height of back rest, above the top of the seat shall be 450±5mm.

Seat Height The seat height of the chair shall be 430±5mm.

10.1b MATS

10.1.1b **Number/Quantity**

Four per class

10.1.2b **Description/Explanation**

A primary class requires a variety of approaches of teaching learning and many times the seating arrangements have to be changed. Hence the seating equipment for children should be such as allows for forming small groups also within the classroom. It will be better if small square dures are supplied which can be put together for the activities for the whole class and separated as and when required for activities in small groups.

10.1.3b **Specifications**

10.1.3.1b *Content* Nil

10.1.3.2b *Material*

— may be made of cotton, nylon, jute threads.

10.1.3.3b Size

- each of 8 sq metres.

10.1c BOXES**10.1.1c Number/Quantity**

Two

10.1.2c Description/Explanation

For proper maintenance and longevity of the essential materials being provided to primary schools, provision of proper storing arrangements is a must. The new school buildings/rooms being constructed/to be constructed should have inbuilt almirahs for this purpose. In the existing school buildings where there are no almirahs, two boxes, with locking facilities may be provided for this purpose.

10.1.3c Specifications**10.1.3.1c Content** Nil**10.1.3.2c Material**

- be of steel/iron, wood

10.1.3.3c Size

- as per requirement

P.N. DAVE
DAI JIT GUPTA

10.2 BLACKBOARD**10.2.1 Number/Quantity**

Two

10.2.2 Description/Explanation

A blackboard is used for presenting visual and verbal information usually for a short period of time. It provides an opportunity, as no other aid can, to convey the visual messages during classroom teaching. It may also be used for

display of other material. It is generally made of a variety of materials such as cement plaster (permanently stuck in wall), wood, plywood, glass, plastic, asbestos, etc. Here specifications of plastic and wooden blackboards are given.

10.2.3 Specifications

10.2.3.1 Content Nil

10.2.3.2 Material

- should be made of plastic/wood.
- * Wood.
 - should be light weight, but have minimum thickness of 4 mm ply. [The boards of size 120 cm × 120 cm and beyond should have minimum thickness of 6 mm ply.]
 - (frame) should be at least 2.5 cm thick and 5 cm broad; be made in such a way that both sides can be used.
 - have a matt surface and be free from glare.
- * Plastic.

[Note: Indian Petrochemicals Corporation Limited, Vadodara has developed several prototypes and undertaken extensive field trials, at the instance of MHRD, GOI. At this juncture, this prototype(s) seems to be the only product, which has been subjected to adequate scientific and classroom tests.]
- * The Prototype.
 - possess tailor made properties, ease of processing, consistent quality, safety, aesthetics, etc.
 - has matt (surface) finish.
 - weight is 3 kg only exclusive of frame.
 - is free from glare.
 - has nil recurring expenditure.

10.2.3.3 Size/Weight

- the sizes of blackboards available in the market vary from as small as 20 cm × 20 cm to as large as 120 cm × 200 cm or may even be larger. However a board of 90 cm × 120 cm should suffice for the primary stage and hence recommended.

10.2.3.4 Colour

- be painted with special "Blackboard Paint" available in Black and Olive Green colour.

ADDITIONAL INFORMATION

For plastic blackboard, enquire at the following addresses :
Production Management and Development Group (Polymers)
Marketing Division
Indian Petrochemicals Corporation Ltd.
(Govt. of India Undertaking)
P.O. Petrochemicals
Dist. Vadodara 391346
Gujarat

TELEX 175364

Regional Offices :

- * Kirti Towers, 9th Floor
Tilak Road
Vadodara 390001
- * Ashoka Estate, 10th Floor
24 Barakhamba Road
New Delhi 110001
- * Air India Building
19th Floor, Nariman Point
Bombay 400 021
- * Ralla Ram Building
70, Mission Road
Bangalore 560027

Sales Centres :

- * Ludhiana Sales Centre
Red Cross Bhavan
1st Floor, The Mall
Ludhiana 141001
- * Madras Sales Centre
33, D'Silva Road
Mylapore
Madras 600004
- * Ahmedabad Sales Centre
Shantikunj, Opp. Polytechnic
Dr. Vikram Sarabhai Marg
Ambawadi
Ahmedabad 380015

- * A.G. Tower, 7th Floor
125/1, Park Street
Calcutta 700016

10.3 ROLLERBOARD

10.3.1 Number/Quantity

Two

10.3.2 Description/Explanation

A rollerboard is made of PVC black sheet, fixed to wooden rollers on both sides. It is easy to store, carry and display. On a good quality rollerboard, chalk writes very smoothly, and can easily be cleaned by an ordinary cloth or brush type cleaner/duster. It is available in many sizes like 68cm×100 cm and 100cm×135 cm. Now-a-days graph rollerboards are also available. On them, graph centimeters in colours showing squares of 1 cm, 5 cm, 10 cm are printed. They can be used by teachers for making accurate diagrams. For teaching writing skills, lined rollerboards are available and for teaching geography, boards printed with outline maps of India, Asia, World are also available.

10.3.3 Specifications

10.3.3.1 Content Nil

10.3.3.2 Material

- (PVC) be of good quality on which chalk should write brightly.
- thickness 0.20 mm.

10.3.3.3 Size

- should be at least 68 cm×100 cm.
- should be straight. Thumb nails fixing the PVC with the roller should be at the most 10 cm apart.

10.3.3.4 Colour

- be black, green or blue.

10.4 CHALK

10.4.1 Number/Quantity

400 Pieces.

10.4.2 Description/Explanation

Chalks are the sticks by which a teacher writes content and draws diagrams, graphs, illustrations, etc., on the blackboard. They are manufactured by a mixture of whiting and binder.

10.4.3 Specifications

10.4.3.1 *Content* Nil

10.4.3.2 *Material*

- be made of good quality calcium sulphate (calcined gypsum), reasonably free from poisonous and toxic materials injurious to human beings.
- be of homogeneous mass free from grease, grit and sandy abrasives.
- conform to the requirements specified by ISI—Moulded, white (IS : 2694—1963), i.e., at least 80% whiting, 15% binder and moisture should never exceed 5%
- not be too hard.
- write easily and brightly.
- not break or crumble; nor split too much dust.
- not leave marks, stains, smears after erasing. Occasional wet cleaning should clear off any such marks/stains/smears.
- * **Finish**
 - be circular in cross-section and tapered at one end; be of smooth uniform shape and size and be free from external blow holes.
- * **Hardness**
 - should produce freely, without scratching or otherwise harming the blackboards, visible and distinct marks that can be easily erased with a piece of dry cloth.
- * **Packing**
 - be packed in suitable paperboard containers which offer adequate protection to the chalks during transportation; be tightly packed in the container with saw dust or other cushioning materials. Each box should contain 100 chalks.

10.5 DUSTER

10.5.1 Number/Quantity

Two.

10.5.2 Description/Explanation

A blackboard duster is generally a piece of soft cloth. It is also made of woodblock on which a felt, foam or sponge piece is fixed with adhesive. Now-a-days blackboard dusters made of plastic with felt, foam or sponge pieces are also available. The dusters made of plastic and foam are long lasting. The dusters made of cloth are also long lasting. The wet cloth duster is very effective for cleaning the blackboard and for removing the marks/smears/stains.

10.5.3 Specifications

10.5.3.1 *Content* Nil.

10.5.3.2 *Material*

- piece of soft cloth.
- the plastic or wood piece should be of high quality.
- the felt/foam/sponge should be fixed tightly. The adhesive should be strong.

T.R. BAWA
S.P. MULICK

10 6 TRASH CAN**10.6.2 Number/Quantity**

Ten

10.6.3 Description/Explanation

Nil

10.6.4 Specifications

No specifications required.

ITEM 11

Miscellaneous Equipment

11.1 SCHOOL BELL

11.1.1 Number/Quantity

One.

11.1.2 Description/Explanation

Nil

11.1.3 Specifications

No specifications required.

11.2 WATER FACILITY (PITCHERS, GLASSES, AND LADLE)

11.2.1 Number/Quantity

As per requirement.

11.2.2 Description/Explanation

Nil

11.2.3 Specifications

No specifications required.

Guidelines regarding purchase of Children's Books under the Scheme of Operation Blackboard

1. There are about 55 lakh primary schools in the country which are proposed to be covered under the scheme of Operation Blackboard in phases. This is expected to involve an expenditure of about Rs. 96 crores on this item alone. It is, therefore, of utmost importance that great care should be exercised in the proper selection of books for children. Accordingly, it is suggested that the following guidelines should be adopted for the selection and procurement of books under the Operation Blackboard Scheme.

Selection of Books

Books should be chosen keeping in mind that they are meant for children of the age-group of 6-11 years. They should be attractive, well written, pictorial and of a kind to excite curiosity and retain interest of the children. Following subject areas for selection of books are suggested:

- 1 Folk Tales
- 2 Mythology
- 3 Fiction
- 4 Cultural Heritage
- 5 Land and People
- 6 Festivals of India
7. Freedom Struggle
8. National Symbols and National Heroes
9. Biographies—National leaders, Freedom Fighters and others
- 10 Breakthrough Readers
11. Rhymes and Pictures
- 12 Plant and Animal life
- 13 Popular games and sports
- 14 Travelogues
- 15 Stories/fiction including science fiction.

This may be treated as an illustrative list only and not an exhaustive use one.

2 NCERT has already prepared a suggestive list of 321 books published by NBT, CBT, NCERT and Publication Division, Ministry of Information and Broadcasting. This list has already been circulated to all State Governments. This may form the initial central list of suggestive books which would be updated from time to time and also include books published by the publishers in the private sector. This list will help in fostering national integration and make available a wide range of books of common interest to the children throughout the country. The State Govt. may also prepare a similar list after taking into account the current needs, the cultural heritage and the language of the local people. This list should also be updated by the State Governments periodically, say after six months. The purchase of books should be confined to these two lists.

3 The preparation of the suggestive State list may be entrusted to a Committee formed for this purpose. The Committee should have representation from eminent authors, illustrators, children's book reviewers and production experts. Such a Committee may meet periodically and selection should be made a continuous process so that new publications can be added regularly.

4. In order to get suitable books available in regional languages, State Governments may make arrangements to get selected books translated from one language into another with the assistance of the private publishers after completing formalities relating to the Copyright, etc.

Procedure of Procurement

5 The selection of books should not be confined to those published by Government agencies alone and books published by the private publishers may also be considered.

6. Books should not be purchased by calling tenders or quotations. The major factors which may be taken into consideration while selecting the books should be—quality of production, vis-a-vis pricing and quality of illustrations, etc. Print size should be easily readable and it should not be below 16 points and the books should be well bound. Paper used should not be of less than 70 gsm.

7. The States/Union Territories may evolve a Pricing Formula to determine the unit cost of production after taking into account the cost of paper, printing, royalty to the authors, illustrators and artists. To cover distribution charges and fair margin of profit, the price of the books should be fixed by increasing the unit cost of production by 50%.

8 Since the costing formula referred to above does not provide undue margin of profit, State Government should not insist on any discount from the publishers after fixing the price of the book as per the Pricing Formula.

9. Sufficient notice for selection of books should be given by issuing advertisement in a national newspaper and a local leading daily.

10. Since required number of copies of a title may not be readily available in stock, adequate time (not less than 2 months) should be given to the publishers to print and supply the books. To ensure that the publishers honour their commitment regarding supply of books in time, some earnest money may be secured from them.

11 The point of delivery should be decided in advance and adequate arrangements made to receive the consignment and to compare the supplies with the sample. The books so received should be distributed among the users at the earliest possible time.

12. Under the scheme of setting up a National Centre for Children's Literature, the National Book Trust, with the help of the NCERT and Language Committees of writers, illustrators and children's literature experts is being made responsible for identifying quality reading material which is available with publishers both in the public and private sectors. These Committees would evaluate books from the point of view of content, quality of production and pricing (on the basis of a pricing formula to be determined in consultation with the publishers' associations). This procedure will provide for continuous upgrading of the central list.

13. The list of selected books should be publicly displayed and a copy each of all books purchased should be sent to the National Centre for Children's Literature being set up at A-5, Green Park, New Delhi 110016, under the aegis of National Book Trust.

APPENDIX 2

Suggestive List of Books for Library

S.NO.	Title	Version	Publisher	Price
1.	Inventions that Changed the World I	English	NBT	2.50
2.	Inventions that Changed the World II	"	"	2.50
3.	As They Saw India	"	"	2.50
4.	Diwali	"	"	5.00
5.	Some Street Games of India	"	"	2.50
6.	The Broken Wings and Other Asian Tales	"	"	2.50
7.	Our Trees	"	"	5.00
8.	How Munia Found Gold	"	"	2.50
9.	Books Forever	"	"	2.50
10.	India's Young Heroes	"	"	2.50
11.	Our Useful Plants	"	"	2.50
12.	Animal World	"	"	5.00
13.	The Rainbow	"	"	2.50
14.	Procession 1-10	"	"	5.00
15.	What is Right? What is Wrong?	"	"	5.00
16.	Busy Ants	"	"	5.00
17.	A Journey to Gaumukh	"	"	2.50
18.	Festival of Eid	"	"	2.50
19.	Homes	"	"	5.00
20.	A Voice in the Jungle	"	"	5.00
21.	A Visit to the City Market	"	"	5.00
22.	Matsya	"	"	2.50
23.	My First Railway Journey	"	"	5.00
24.	Tilli The Butterfly	"	"	2.50
25.	The Story of Blood	"	"	2.50
26.	This is Rajasthan	"	"	5.00
27.	I Like the World	"	"	2.50
28.	A Story About Tea	"	"	2.50
29.	Red Kite	"	"	2.50
30.	Rohanta and Nandriya	"	"	2.50
31.	Vishwa Ko Badal Denewaley Aavishkar Part II	Hindi	"	2.50
32.	Inki Duniya	"	"	5.00
33.	Ghar aur Ghar	"	"	5.00

S.NO.	Title	Version	Publisher	Price
34.	Tehrah Anupam Kahanian	"	"	12.00
35.	Sab Kaa Saathi Sab Ka Dost	"	"	2.50
36.	The Rainbow	"	"	2.50
37.	Tilli Titalee	"	"	2.50
38.	Kya Sahie Kya Galat	"	"	5.00
39.	Railgaari Chale Chhukchhuk	"	"	5.00
40.	Kitani Pyari Hai Yeh Duniya	"	"	2.50
41.	Sub Se Pyara Kaun	"	"	2.50
42.	Diwali	"	"	5.00
43.	Tuta Pankh aur Anya Kahanian	"	"	2.50
44.	Bus ki Sair	"	"	2.50
45.	Choti Cheenti Kaam Barra	"	"	5.00
46.	Idgah	"	"	2.50
47.	Shore Mucha Jungle Mein	"	"	5.00
48.	Matsya	"	"	2.50
49.	Lal Patang	"	"	2.50
50.	Hum Hindustani	"	"	2.50
51.	Rakt ki Kahani	"	"	2.50
52.	Pustaken jo Amar Hain	"	"	2.50
53.	Humaari Nadiyon ki Kahani Bhag I	"	"	2.50
54.	Humaari Nadiyon ki Kahani Bhag II	"	"	2.50
55.	Pakshi Jagat	"	"	2.50
56.	Gaumukh Yaatra	"	"	2.50
57.	Subramania Bharati	"	"	2.50
58.	Gautam Buddha	"	"	2.50
59.	Vanya Jeevan	"	"	2.50
60.	Rohant Aur Nandiya	"	"	2.50
61.	Pradooshan	"	"	2.50
62.	Daak Ticket ki Kahani	"	"	2.50
63.	Veeron ki Kahanian	"	"	2.50
64.	Antrisha ka Vardaan	"	"	2.50
65.	Chai ki Kahani	"	"	2.50
66.	The Rainbow	Bengali	"	2.50
67.	I Like The World	"	"	2.50
68.	Summer Tree Contest	"	"	2.50
69.	We Indians	"	"	2.50
70.	Books Forever	"	"	2.50
71.	The Story of Our Rivers	"	"	2.50
72.	Watching Birds	"	"	2.50
73.	Rohanta and Nandriya	"	"	2.50
74.	Inventions That Changed The World I	"	"	2.50
75.	Inventions That Changed The World II	"	"	2.50
76.	Romance of Postage Stamps	"	"	2.50
77.	Stories of Valour	"	"	2.50
78.	The Rainbow	Assamese	"	2.50

S.NO.	Title	Version	Publisher	Price
79.	The Summer Tree Contest	"	"	2.50
80.	Madam Rides The Bus	"	"	2.50
81.	The Broken Wings and Other Asian Tales	"	"	2.50
82.	Idgah	"	"	2.50
83.	We Indians	"	"	2.50
84.	Gautam Buddha	"	"	2.50
85.	A Story About Tea	"	"	2.50
86.	Pollution	"	"	2.50
87.	Wild Woodnotes	"	"	2.50
88.	Rohanta and Nandriya	Oriya	"	2.50
89.	Pollution	"	"	2.50
90.	Romance of Postage Stamps	"	"	2.50
91.	Inventions That Changed The World Part I	"	"	2.50
92.	Rainbow	"	"	2.50
93.	I Like The World	"	"	2.50
94.	The Summer Tree Contest	"	"	2.50
95.	The Broken Wings and Other Asian Tales	"	"	2.50
96.	Idgah	"	"	2.50
97.	We Indians	"	"	2.50
98.	Books Forever	"	"	2.50
99.	The Story of Our Rivers I	"	"	2.50
100.	The Story of Our Rivers II	"	"	2.50
101.	The Cosmic Gift	"	"	2.50
102.	Gautama Buddha	"	"	2.50
103.	Wild Woodnotes	"	"	2.50
104.	Tilli The Butterfly	Punjabi	"	2.50
105.	Sab ka Saathi Sab ka Dost	"	"	1.50
106.	Gautam Buddha	"	"	2.50
107.	The Summer Tree Contest	"	"	2.50
108.	The Broken Wings and Other Asian Tales	"	"	2.50
109.	Madam Rides the Bus	"	"	2.50
110.	Idgah	"	"	2.50
111.	Matsya	"	"	2.50
112.	Red Kite	"	"	2.50
113.	The Story of Blood	"	"	2.50
114.	Books Forever	"	"	1.50
115.	Watching Birds	"	"	2.50
116.	Rohanta and Nandriya	"	"	1.50
117.	Pollution	"	"	2.50
118.	The Story About Tea	"	"	2.50
119.	Romance of Postage Stamps	"	"	1.50
120.	Idgah	Urdu	"	2.50
121.	We Indians	"	"	2.50
122.	I Like The World	"	"	2.50
123.	The Summer Tree Contest	"	"	2.50
124.	Red Kite	"	"	2.50

S.NO.	Title	Version	Publisher	Price
125.	Tilli The Butterfly	"	"	2.50
126.	The Rainbow	"	"	2.50
127.	The Broken Wings and Other Asian Tales	"	"	2.50
128.	Madam Rides The Bus	"	"	2.50
129.	The Story of Our Rivers II	"	"	1.50
130.	The Pollution	"	"	2.50
131.	Books Forever	"	"	1.50
132.	The Story of Blood	"	"	2.50
133.	Romance of Postage Stamps	"	"	1.50
134.	Gautam Buddha	"	"	2.50
135.	The Cosmic Gift	"	"	2.50
136.	A Story About Tea	"	"	2.50
137.	Wild Woodnotes	"	"	2.50
138.	Books Forever	Malayalam	"	1.50
139.	Story of Our Rivers Part I	"	"	1.50
140.	Story of Our Rivers Part II	"	"	1.50
141.	Stories of Valour	"	"	2.50
142.	Rohanta and Nandriya	"	"	2.50
143.	Romance of Postage Stamps	"	"	1.50
144.	Watching Birds	"	"	1.50
145.	I Like the World	"	"	2.50
146.	Watching Birds	Gujarati	"	2.50
147.	Books Forever	"	"	2.50
148.	Madam Rides the Bus	"	"	2.50
149.	Broken Wings and Other Asian Tales	"	"	2.50
150.	I Like the World	"	"	2.50
151.	Stories from Bapu's Life	"	"	2.50
152.	Inventions That Changed The World I	"	"	2.50
153.	Inventions That Changed The World II	"	"	2.50
154.	Pradushan	Marathi	"	2.50
155.	Rohanta and Nandriya	"	"	1.50
156.	Wild Woodnotes	"	"	2.50
157.	We Indians	"	"	2.50
158.	Red Kite	"	"	2.50
159.	Festival of Id	"	"	2.50
160.	Madam Rides The Bus	"	"	2.50
161.	I Like the World	"	"	2.50
162.	The Rainbow	"	"	2.50
163.	Tilli The Butterfly	"	"	2.50
164.	Gautam Budh	"	"	2.50
165.	Inventions That Changed The World II	"	"	1.50
166.	Cosmic Gift	Telugu	"	2.50
167.	Story of Valour	"	"	2.50
168.	Romance of Postage Stamps	"	"	2.50
169.	Gautam Budh	"	"	2.50

S.NO.	Title	Version	Publisher	Price
170.	Subramania Bharati	"	"	2.50
171.	We Indians	"	"	2.50
172.	Red Kite	"	"	2.50
173.	Madam Rides the Bus	"	"	2.50
174.	Broken Wings and Other Asian Tales	"	"	2.50
175.	I Like the World	"	"	2.50
176.	Tilli the Butterfly	"	"	2.50
177.	Romance of Postage Stamp	Tamil	"	2.50
178.	Rohanta and Nandriya	"	"	1.50
179.	Subramania Bharati	"	"	2.50
180.	Watching Birds	"	"	2.50
181.	Story of Our Rivers I	"	"	2.50
182.	Story of Our Rivers II	"	"	2.50
183.	Books Forever	"	"	1.50
184.	I Like the World	"	"	2.50
185.	Inventions That Changed the World I	"	"	1.50
186.	Inventions That Changed the World II	"	"	1.50
187.	Cosmic Gift	Kannada	"	2.50
188.	Rohant and Nandriya	"	"	2.50
189.	Watching Birds	"	"	2.50
190.	We Indians	"	"	2.50
191.	I Like the World	"	"	2.50
192.	Festival of Id	"	"	2.50
193.	Barber At The Zoo	English	CBT	6.00
194.	Cuckoo Clock, The	"	"	6.00
195.	Fool's Paradise	"	"	4.50
196.	Giant of The Jungle, The	"	"	6.00
197.	Indira Priyadarshini	"	"	20.00
198.	Kaziranga Trail, The	"	"	9.50
199.	Kitty Kite	"	"	6.00
200.	Legends From Indian History	"	"	9.50
201.	Letters From a Father to His Daughter	"	"	10.00
202.	Little Red Cart, The	"	"	5.00
203.	Mamani's Adventure	"	"	6.00
204.	More Short Stories for Children	"	"	10.00
205.	Mother is Mother	"	"	6.50
206.	My Garden	"	"	6.50
207.	Mystery of Fake Arjuna	"	"	9.00
208.	My Wall	"	"	4.00
209.	Nehru For Children	"	"	11.00
210.	Once Upon a Forest	"	"	10.00
211.	Our Scientists	"	"	12.00
212.	Passage to Antarctica	"	"	12.50
213.	Some Indian Birds	"	"	11.50
214.	Stories From Panchatantra	"	"	50.00

S.NO.	Title	Version	Publisher	Price
215.	Tales From Indian Classics I	"	"	11.00
216.	Tales From Indian Classics II	"	"	11.00
217.	Tales From Indian Classics III	"	"	9.50
218.	Time to Rhyme	"	"	7.00
219.	Treasury of Indian Tales I	"	"	11.00
220.	Amma Sabki Pyari Amma	Hindi	"	6.50
221.	Eitihashik Gathayen	"	"	9.50
222.	Cuckoo Ghari	"	"	6.00
223.	Kori Kalpana	"	"	5.00
224.	Kuchh Bhartiya Pakshi	"	"	11.50
225.	Krishan Sudama	"	"	4.00
226.	Khargosh Ki Chalaki	"	"	4.50
227.	Chidiyaghar Ka Nai	"	"	6.00
228.	Jawaharlal Nehru	"	"	11.00
229.	Tarangon Ka Tandav	"	"	3.00
230.	Nal Damyanti	"	"	7.00
231.	Nanhe Munne Geet	"	"	7.00
232.	Nanhe Munne Chuhe Chuhiya Aur Bhaari Bharkam Hathi	"	"	6.50
233.	Pyasi Maina	"	"	6.00
234.	Panchatantra Ki Kahaniyan	"	"	50.00
235.	Pita Ke Patra Putri Ke Naam	"	"	10.00
236.	Poranik Kahaniyan I	"	"	11.00
237.	Poranik Kahaniyan II	"	"	11.00
238.	Poranik Kahaniyan III	"	"	9.50
239.	Batuni Kachua	"	"	4.50
240.	Beenu Bhalu	"	"	3.75
241.	Bechara Ribbon	"	"	5.00
242.	Bharat Ki Lok Katha Nidhi I	"	"	11.00
243.	Bharat Ki Lok Katha Nidhi II	"	"	11.00
244.	Moorkhon Ka Swarag	"	"	4.50
245.	Mera Gabboo	"	"	6.00
246.	Mere Sishu Geet	"	"	6.00
247.	Meri Bagia	"	"	6.50
248.	Meri Maa	"	"	5.50
249.	Motor Car	"	"	5.00
250.	Rang Birangee Geet	"	"	6.00
251.	Robin Aur Bej	"	"	13.00
252.	Vishwas Ki Jeet	"	"	6.00
253.	Samrajay Hila Chutki Bhar Namak Se	"	"	7.00
254.	Hawai Jahaj	"	"	5.00
255.	Hathi Ek Anokha Pashu	"	"	6.00
256.	Hamare Vigyanik	"	"	12.00
257.	Kati Patang	"	"	-
258.	Lal Ghari	"	"	-

S.NO.	Title	Version	Publisher	Price
259.	Kaziranga Trail, The	Bengali	"	8.00
260.	Legends From Indian History	"	"	9.00
261.	My Wall	"	"	4.00
262.	My Garden	"	"	6.50
263.	Our Feathered Friends	"	"	15.00
264.	Tales From Indian Classics I	"	"	11.00
265.	Tales From Indian Classics II	"	"	11.00
266.	Tales From Indian Classics III	"	"	9.50
267.	Kitty Kite	"	"	—
268.	Contours of Courage	English	NCERT	8.35
269.	Legends of India	"	"	3.00
270.	Sant Tukaram	"	"	1.60
271.	Brave Boys of the Past	"	"	2.95
272.	The Hidden Gold	"	"	7.70
273.	The Ship of the Desert	"	"	6.85
274.	Mr. Mugger and Mr. Stripes	"	"	9.90
275.	Where is My Hump	"	"	6.05
276.	Why is Fatty Happy	"	"	5.20
277.	Life is Difficult	"	"	5.85
278.	Bahuroopie Gandhi	Hindi	"	2.20
279.	Uttarakhand Ki Yatra	"	"	6.25
280.	Penguin Ke desh Mein	"	"	11.20
281.	Chikitsa Virgyan Ki Kahaniyan	"	"	9.60
282.	Vishva Ki Prasiddha Lok Kathayen	"	"	17.15
283.	Baba Amte	"	"	4.55
284.	Aise The Rajendra Babu	"	"	—
285.	Ghar Se Door	"	"	5.15
286.	Kala Sagar Gora Desh	"	"	—
287.	Jungle Ki Kahani	"	"	—
288.	Mahabharat Ki Kahaniyan	"	"	—
289.	Adventures of Spacecraft	English	Publications Division	10.00
290.	Anna Saheb Karve	"	"	4.50
291.	Amar Shaheed Ganesh Shankar Vidyarthi	"	"	11.00
292.	Children's History of India	"	"	17.00
293.	Children's Ramayana	"	"	7.00
294.	Gandhi Story	"	"	10.00
295.	Our Freedom Movement	"	"	3.50
296.	Path of Greatness in Science	"	"	10.00
297.	Rabindra Nath Tagore	"	"	13.00
298.	Story of Jawaharlal Nehru	"	"	10.00
299.	Story of Jallianwala Bagh	"	"	3.50
300.	Aat Pat Nagar Ki Kahaniyan	Hindi	"	11.00
301.	Bharat Ki Veer Gathaen	"	"	7.00
302.	Anna Saheb Karve	"	"	4.50

S.NO.	Title	Version	Publisher	Price
303.	Adhunik Bharat Ki Arthik Kahani	"	"	5.00
304.	Amar Muskan	"	"	10.00
305.	Adarsh Vidyarathi Bapu	"	"	2.50
306.	Amar Shaheed Bhagat Singh	"	"	13.50
307.	Bharat Ke Nari Ratna	"	"	10.50
308.	Chiriyon Ki Duniya	"	"	13.00
309.	Chhatrapati Shivaji	"	"	9.00
310.	Hansi Hansi Mein	"	"	5.50
311.	Hanste Hue Moti	"	"	8.00
312.	Jungle Ke Nagrik	"	"	6.00
313.	Nakal Ka Nateeja	"	"	8.00
314.	Pauranik Baal Kathaen	"	"	7.00
315.	Rang Birange Phool	"	"	8.50
316.	Rabindranath Thakur Ki Baal Kahaniyan	"	"	11.50
317.	Rochak Etihask Kahaniyan	"	"	8.00
318.	Tendua Aur Cheeta	"	"	8.00
319.	Tota Maina	"	"	6.50
320.	Vedic Kal Ki Kathaen	"	"	6.00
321.	Yeh Gatha Veer Jawahar Ki	"	"	7.00

